

Title of Research:

20-3-02

Development of a short-term *in vivo* assay for thyroid hormone disrupting activity in maternal rats and their fetus/pups as prescreening for potential of developmental neurotoxicity.

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Summary of Research:

While thyroid hormones (THs) are essential for brain development, effects of mild suppression of maternal blood THs by hepatic enzyme inducers on the infant brain developments is not fully understood. Conducting guideline study to identify of developmental neurotoxicity induced by chemicals requires significant resources (animals, time and costs). A simple screening test for investigating whether maternal chemical exposure reduces brain THs in fetal and neonatal rats would be valuable. To verify reliability of the Comparative Thyroid Assay with additional examination of the brain, THs and histology, propylthiouracil (PTU, 10 ppm) and phenobarbital (PB, 1000 ppm) were dosed by feeding. Clearly suppressed brain THs in rat fetuses and pups and brain abnormality (heterotopia) in pups were noted with PTU but not with PB. Reproducibility and effects of PB at higher dose level will be examined in further study.

Timeline:

March 1, 2020 – February 28, 2021.

Topics:

Oral presentation at JCIA LRI Annual Workshop 2020 “Development of a short-term *in vivo* assay for thyroid hormone disrupting activity in maternal rats and their fetuses/pups as prescreening for potential of developmental neurotoxicity.” (On-line, August 21st, 2020)

Publications:

1. Hidenori Suto¹, Akira Sato², Keiko Ogata¹, Kenta Minami¹, Tadashi Kosaka², Hitoshi Hojo², Naofumi Takahashi², Naruto Tomiyama², Katsumasa Iwashita¹, Hiroaki Aoyama², Tomoya Yamada¹ (1 Sumitomo Chemical Company, Ltd. 2 The Institute of Environmental Toxicology)
“Development of a short-term *in vivo* assay for thyroid hormone disrupting activity in maternal rats and their fetuses/pups as prescreening for potential developmental neurotoxicity: Propylthiouracil and phenobarbital examples. I. Findings in maternal rats and their fetuses”. The 48th Annual Meeting of the Japanese Society of Toxicology, Kobe, Japan, July 2021.
2. Akira Sato¹, Hidenori Suto², Keiko Ogata², Kenta Minami², Tadashi Kosaka¹, Hitoshi Hojo¹, Naofumi Takahashi¹, Naruto Tomiyama¹, Katsumasa Iwashita², Hiroaki Aoyama¹, Tomoya Yamada² (1 The Institute of Environmental Toxicology 2 Sumitomo Chemical Company, Ltd.)
“Development of a short-term *in vivo* assay for thyroid hormone disrupting activity in maternal rats and their fetuses/pups as prescreening for potential developmental neurotoxicity:



Propylthiouracil and phenobarbital examples. II. Findings in maternal rats and their pups".
The 48th Annual Meeting of the Japanese Society of Toxicology, Kobe, Japan, July 2021.